



ROLL-UP SIGNS (MGS-04-01)

1.0 DESCRIPTION. This specification covers roll-up signs consisting of a signs, including overlays, and bracing to be used in temporary traffic control zones.

2.0 MATERIAL.

2.1 SIGNS AND OVERLAYS.

2.1.1 SUBSTRATES. Sign and overlay blanks shall consist of microprismatic, retroreflective sheeting, in colors specified, sealed to a heavy-duty coated fabric or vinyl material of like or neutral color. Sheeting shall be UV stabilized to meet weathering requirements of ASTM G23 or G26 and shall have a minimum coefficient of retroreflection specified below when measured in accordance with ASTM E810. Color, heat resistance and impact resistance of the sheeting shall be in accordance with the latest version of ASTM D4956

Minimum Coefficient of Retroreflection (R_A) at 90 Degree Rotation Angle (cd/fc/ft ²)					
Observation Angle (degree)	Entrance Angle (degree)	Color			
		Fluorescent Pink	Fluorescent Orange	White	Yellow
0.2	-4	135	200	250	170
0.2	+30	60	100	95	64
0.5	-4	60	80	200	136
0.5	+30	25	30	60	40

2.1.2 DESIGN AND LAYOUT. Signs and overlays shall be of the color and size specified below. Sign and overlay borders, legends (size and copy), and symbols, as applicable, shall conform to the latest editions of the *Manual on Uniform Traffic Control Devices* and the *Standard Highway Signs* book and shall be silk-screened onto the face of the sign. Ink used in production of the signs and overlays shall be conform to industry color standards and shall be compatible with the sheeting and shall not crack, peel, split or delaminate from the sheeting for the useful life of the sign. For ease of sign identification when stored, the legend, or worded description for symbol signs, shall be printed near the bottom corner of the sign, between the border and the edge of each sign.

Sign				Overlay Package ¹		
Number	Description	Color ²	Size ³	Description	Color ²	Size ^{4,5}
E5-1	Gore Exit w/ 45° Right Arrow	BoFO	36"x48" Rect.			
E5-2	EXIT CLOSED	BoFO	48"x36" Rect.			
E5-2a	EXIT OPEN	BoFO	48"x36" Rect.			
R1-1	STOP	RoW	36" Oct.			
R1-2	YIELD	RoW	48" Tri.			
R2-1	SPEED LIMIT 35	BoW	36"x48" Rect.	4/5 (2-sided), 6/7 (2-sided), & 0 (1-sided)	BoW	15"x17" (30"x17" equiv. sign area)



R11-2	ROAD CLOSED	BoW	48"x30" Rect.			
W1-4L	Reverse Curve Left (Symbol)	BoFO	48"x48"			
W1-4R	Reverse Curve Right (Symbol)	BoFO	48"x48"			
W3-1a	Stop Ahead (Symbol)	BoFO w/ RoW symbol	48"x48"			
W3-2a	Yield Ahead (Symbol)	BoFO w/ RoW symbol	48"x48"			
W3-3	Signal Ahead (Symbol)	Blk, Rd, Ylw, Grn on Fl Or	48"x48"			
W3-4	BE PREPARED TO STOP	BoFO	48"x48"			
W3-5	Reduced Speed Ahead (Symbol)	BoFO	48"x48"	35/40 (2-sided) & 45/50 (2-sided)	BoW on Fl Or	SL sign size + 1- 1/2" Fl Or border
W5-4	RAMP NARROWS	BoFO	48"x48"			
W8-1	BUMP	BoFO	48"x48"			
W8-2	DIP	BoFO	48"x48"			
W8-7	LOOSE GRAVEL	BoFO	36"x36"			
W9-3	MERGE w/ Arrow	BoFO	48"x48"	Arrow (Symbol)	BoFO	24"x12"
W20-1	ROAD WORK AHEAD	BoFO	48"x48"	RAMP/BRIDGE (2-sided)	BoFO	26"x10"
W20-3	ROAD CLOSED AHEAD	BoFO	48"x48"			
W20-3a	ROAD CLOSED 500 FT	BoFO	48"x48"			
W20-4	ONE LANE ROAD AHEAD	BoFO	48"x48"			
W20-5	RIGHT LANE CLOSED AHEAD	BoFO	48"x48"	LEFT LANE/CENTER LANE (2-sided)	BoFO	40"x9"
W20-5a	RIGHT TWO LANES CLOSED AHEAD	BoFO	48"x48"	LEFT/CENTER (2-sided)	BoFO	20"x9"
W20-7a	Flagger (Symbol)	BoFO	48"x48"			



W21-2	FRESH OIL	BoFO	36"x36"			
W21-6	SURVEY CREW	BoFO	48"x48"			
MoDOT	FRESH OIL LOOSE GRAVEL	BoFO	36"x36"			
MoDOT	WATER OVER ROAD	BoY	48"x48"			
MoDOT	RIGHT LANE CLOSED	BoFO	48"x48"	LEFT/CENTER (2-sided)	BoFO	26"x10"
MoDOT	MOWERS AHEAD	BoFO	48"x48"			
MoDOT	SHOULDER WORK AHEAD	BoFO	48"x48"			
MoDOT	SWEEPER AHEAD	BoFO	48"x48"			
MoDOT	LITTER CREW AHEAD	BoFO	48"x48"			
MoDOT	STEEL PLATE IN ROADWAY	BoFO	48"x48"			
MoDOT	SPRAYING OPERATIONS AHEAD	BoFO	48"x48"			

- (1) Overlay packages are supplied as part of the associated sign.
- (2) BoW = Black on White; RoW = Red on White; BoFO = Black on Fluorescent Orange; BoY = Black on Yellow
- (3) Signs are diamond-shaped unless otherwise specified. Rectangular signs are measured horizontal x vertical.
- (4) Overlay size is approximate. The manufacturer shall ensure actual size provides enough area for the specified overlay legend or symbol, accommodates a buffer space for the overlay attachments, and completely covers the appropriate sign legend or symbol while not obscuring any sign border or relevant legend or symbol.
- (5) Overlays are rectangular and measured horizontal x vertical.

2.1.3 OVERLAY ATTACHMENTS. For signs with overlays, a minimum 3/4-inch wide hook-and-loop material of color similar to the sign and overlay substrates they are placed on shall be used to display the overlay on the sign. The hook portion shall be placed along the length of the top and bottom of those sides opposite the sheeted sides of the overlay. The loop portion shall be placed on the face of the sign in the same dimensions used for the hook portion on the overlay and located on the sign face to display the overlay in its intended position. Each portion shall be securely affixed to the sign and overlay with a weather-resistant stitching material.

2.1.4 BRACING POCKETS. To facilitate attachment of the sign bracing to the sign, a pocket shall be provided on the back of the sign at each unsecured horizontal, vertical, and diagonal rib terminus, except those short horizontal ribs added for use with universal sign holders as



described in Sec 2.2.2. Each pocket shall be positioned to ensure the sign remains taught and maintains its intended shape when the rib is engaged in the pocket and shall be securely attached to the sign with at least two pop rivets. Fabric and sliding pockets, as well as plastic pockets with rivets exposed at the top of the pocket, are not acceptable.

2.1.5 ANTI-KITING DEVICE. A strap consisting of 1-inch wide hook-and-loop material securely affixed back-to-back shall be permanently attached near the center of the back of the sign to allow the user to prevent the sign from billowing away from the sign bracing. The manufacturer may submit alternative designs for department consideration.

2.1.6 STORAGE DEVICE. A strap consisting of 1-inch wide hook-and-loop material securely affixed back-to-back shall be permanently attached to the sign to allow the user to store the roll-up sign easily. The manufacturers may submit alternative designs for department consideration.

2.2 SIGN BRACING.

2.2.1 SUPPORT RIBS. Sign bracing shall be constructed of UV stabilized, bloom- and splinter-resistant, fiberglass ribs conforming to the height and width dimensions specified below. Lengths shall be sufficient to ensure the sign remains taught and maintains its intended shape when the rib is engaged in the pocket. Rib ends shall be shaped or otherwise treated to prevent splintering, sharp edges, and damage to the sign face.

	Height	Width
Horizontal Ribs	3/16"	1-1/4"
Diagonal Ribs	1/4"	1-1/4"
Vertical Ribs	5/16"	1-1/4" (min.)

2.2.2 CONFIGURATION AND DESIGN. Diamond-shaped signs shall have one full vertical and one full horizontal rib. All other signs shall have a bracing configuration designed to present the intended sign shape and shall include a horizontally-centered, full vertical and a horizontal rib. The horizontal rib may extend the width of the sign or be designed for use with universal sign holders.

2.2.3 RIB CONNECTIONS. All ribs shall be fastened together, typically at the intersection of the midpoint of their length and width, with a bolt or rivet combination designed for ease of roll-up sign storage and to minimize damage to the sign material. Bolt combinations shall consist of a zinc-plated steel 1/4-inch slotted-, phillips-, or hex-head bolt, washers, and an all-metal, self-locking nut. Rivet combinations shall consist of a 1/4-inch diameter, semi-hollow, truss-head, zinc-plated steel rivet and washers. Blind or hollow type rivets are not acceptable. Washers shall consist of a zinc-plated 1/4-inch I.D. x 1-inch O.D. x 1/16-inch flat washer located between the fastener pieces and the ribs and between each of the ribs and, if applicable, a zinc-plated 1/4-inch split-ring, lock washer located under the head of the rivet.

2.2.4 SUPPORT STRAP. A strap shall be permanently attached to the upper and lower portions of the vertical rib to allow the user to secure the roll-up sign to a sign support. One end of each strap shall consist of a 1-1/4-inch long (approx.) x 1 inch-wide strap with a plastic or metal D-ring secured to the end. The other end of each strap shall consist of a 7-inch long (approx.) x 1-inch wide strap of hook-and-loop material arranged so the strap adheres to itself



when fed through the D-ring. The manufacturer may submit alternative designs for department consideration.

3.0 QUALIFICATION SAMPLE REQUIRED AT BID. The manufacturer shall submit a diamond-shaped and rectangular-shaped roll-up sign with overlays and written certification of NCHRP 350, Test Level 3 compliance with their bid in order to be considered responsive. Samples will be inspected by the department for conformance to this specification and will be considered, in addition to the bid prices, in the determination of contract award.

4.0 CERTIFICATION. The manufacturer shall provide certification that the roll-up signs supplied conform to the approved samples and are in accordance with the requirements of NCHRP 350, Test Level 3.

5.0 ACCEPTANCE. Acceptance of roll-up signs will be by certification and any tests deemed necessary by the department to ensure the signs are in accordance with this specification.